Specimen Question **Annexure-XXXVI**

DO NOT OPEN THE SEAL UNTIL YOU ARE TOLD TO DO SO

QP-FSL-2024 **Question Booklet No.**

Test Booklet Series

A

FORENSIC SCIENCE

PAPER—II

Time Allowed : 2 Hours **Maximum Marks : 200**

INSTRUCTIONS FOR CANDIDATES

1. Immediately after the commencement of the examination, you should check that this Test Booklet ***does not*** have any unprinted or torn or missing pages or questions etc. If so, get it replaced by a complete Test Booklet.

2. Write your Roll Number on the Test Booklet in the Box provided alongside.

3. This Test Booklet contains **200** questions. Each question comprises of four responses (answers) within as (A), (B), (C) and (D). You should select the response which you feel is the most ***correct*** and mark it on the OMR Answer Sheet.

4. You have to mark all your responses **ONLY** on the separate **OMR Answer Sheet** provided. Also read the directions in the **OMR Answer Sheet**. Fill in all the entries in the OMR Answer Sheet ***correctly***. **DO NOT WRITE/MARK ANYTHING EXCEPT IN THE SPACE PROVIDED FOR IT,** failing which your OMR Answer Sheet ***shall not*** be evaluated.

5. **Count** the number of **questions attempted** carefully and write it down in the space provided **in the OMR Answer Sheet**.

6. After you have completed filling in all your responses on the **OMR Answer Sheet** and the examination has concluded, **you should hand over** to the Invigilator **only the OMR Answer Sheet (in original)**. **You are permitted to take away 2nd Copy of the OMR Answer Sheet and Test Booklet**.

7. Each question carries 1 mark.

8. Candidature would be cancelled in case of non-compliance with any of these instructions.

9. **Penalty for wrong answers :**

THERE WILL BE PENALTY FOR WRONG ANSWERS MARKED BY A CANDIDATE IN THE OBJECTIVE TYPE QUESTION PAPERS.

(i) There are four alternatives for the answer to every question. For each question for which a wrong answer has been given by the candidate, 0·5 mark of the marks assigned to that question will be deducted as penalty.

(ii) If a candidate gives more than one answer, it will be treated as a **wrong answer** even if one of the given answers happens to be correct and there will be same penalty as above to that question.

(iii) If a question is left blank, i.e., no answer is given by the candidate, there will be no penalty for that question.

10. **"Mobile phones, calculators, IT gadgets, smart watch and any other electronic devices such as Bluetooth etc. are not allowed inside the premises where the examination is being conducted. Any infringements of these instructions shall entail disciplinary action including ban from future examinations."**

DO NOT OPEN THE SEAL UNTIL YOU ARE TOLD TO DO SO

1. Who is considered as the "Father of Forensic Toxicology"?

(A) Alphonse Bertillon

(B) Edmond Locard

(C) Mathieu Orfila

(D) Francis Galton

2. The study of hair is known as

(A) toxicology

(B) trichology

(C) traumatology

(D) thanatology

3. Who pioneered the use of fingerprints as a method for personal identification?

(A) Francis Galton

(B) Edmond Locard

(C) Henry Faulds

(D) Karl Landsteiner

4. Which scientist is known for developing the first DNA profiling technique?

(A) Francis Crick

(B) Rosalind Franklin

(C) Sir Alec Jeffreys

(D) James Watson

5. Diatom test is done to determine death due to

(A) drowning

(B) strangulation

(C) hanging

(D) burns

6. Phenol-chloroform extraction method is used for

(A) hand imprints extraction

(B) DNA extraction

(C) hemoglobin extraction

(D) saliva extraction

7. What is the importance of Albert Osborn's work in Forensic Science?

(A) Developed forensic toxicology

(B) Introduced fingerprint analysis

(C) Established questioned document examination

(D) Created the ABO blood typing system

8. Choose the ***correct*** sequence involved in the development of fingerprint using ESDA from the codes given below the sequences :

(i) Tilting and shaking of stage containing toner.

(ii) Electro charging the surface using high voltage corona band.

(iii) Lamination using adhesive acetate sheet.

(iv) Laying of ultra thin polyester film.

(v) Development of intricate fringes.

Codes **:**

(A) *(v), (iv), (ii), (i), (iii)*

(B) *(iv), (ii), (v), (i), (iii)*

(C) *(iv), (ii), (i), (iii), (v)*

(D) *(iii), (v), (iv), (ii), (i)*

9. Diminished capacity is a legal defence that

(A) claims the defendant was completely insane at the time of the crime

(B) reduces liability based on limited mental ability

(C) absolves the defendant of any guilt

(D) confirms competency to stand trial

10. In forensic investigations, which tool is often used to detect trace amounts of biological fluids that are ***not*** visible to the naked eye?

(A) Tweezers

(B) UV light or Alternate Light Source (ALS)

(C) Tape

(D) Camera

11. When collecting soil samples from a crime scene, it is essential to

(A) collect only from the exact crime location

(B) take multiple samples from various locations

(C) mix samples together

(D) dry the samples immediately

12. Which method is commonly used for collecting trace evidence like hair and fiber from a crime scene?

(A) Swabbing

(B) Tweezers

(C) Lifting with tape

(D) Scooping

13. Choose the ***correct*** sequence of method of preparation of cast of 3D footprint on sand surface from the codes given below the sequences :

(i) Application of wooden or metal frame around print.

(ii) Photography of footprint.

(iii) Pouring of solution of Plaster of Paris.

(iv) Visual examination of footprint.

(v) Spraying of hardener solution.

Codes **:**

(A) *(iv), (ii), (i), (iii), (v)*

(B) *(ii), (iv), (i), (iii), (v)*

(C) *(ii), (i), (iii), (iv), (v)*

(D) *(iv), (i), (ii), (iii), (v)*

14. What is the primary objective of expert testimony in Forensic Science?

(A) To advocate for one side in the case

(B) To clarify complex scientific matters for the court

(C) To provide a summary of all the evidences

(D) To persuade the jury of a specific conclusion

15. In Atomic Absorption Spectroscopy, which type of light source is typically used?

(A) Xenon lamp

(B) Mercury vapor lamp

(C) Hollow cathode lamp

(D) Tungsten filament

16. What is the primary principle behind Atomic Absorption Spectroscopy (AAS)?

(A) Measurement of light scattering by atoms

(B) Measurement of light absorption by atoms in the ground state

(C) Measurement of the concentration of ions in solution

(D) Measurement of fluorescence emitted by atoms

17. In immunoelectrophoresis, which of the following is being separated in the gel?

(A) DNA fragments

(B) Proteins and their specific antibodies

(C) Lipids and carbohydrates

(D) Blood cells

18. In gel electrophoresis, what is typically used to stain the gel and make the molecules visible after electrophoresis?

(A) Methylene blue

(B) Ethidium bromide

(C) Sudan black

(D) Iodine solution

19. In immunoelectrophoresis, the separation of antigens is based on which of the following?

(A) Their molecular weights

(B) Their isoelectric points and charges

(C) Their ability to bind to specific antibodies

(D) Their solubility in the gel

20. How does an X-ray machine create an image of an object?

(A) By using heat to detect thermal differences

(B) By detecting the scattering of light from the object

(C) By measuring the absorption of X-rays by the object

(D) By observing changes in sound waves

21. Fingerprint bureau was first established in

(A) India

(B) England

(C) USA

(D) France

22. Which enzyme is involved in the conversion of blood type A to type O?

(A) N-acetylgalactosaminyl-transferase

(B) Galactosyltransferase

(C) Fucosyltransferase

(D) Glucosyltransferase

23. What is the significance of enzyme types in blood typing?

(A) They determine the blood's viscosity

(B) They help identify specific blood group antigens

(C) They measure blood pH

(D) They assess blood oxygen levels

24. Which of the following best describes the Daubert standard?

(A) A requirement for witness credibility

(B) A standard for the admissibility of expert testimony

(C) A guideline for jury instructions

(D) A method for evaluating evidence

25. What is the significance of the Frye standard in relation to expert testimony?

(A) It allows for any evidence to be admitted in court

(B) It requires expert testimony to be generally accepted in the relevant scientific community

(C) It eliminates the need for expert witnesses

(D) It focuses solely on witness credibility

26. Lanugo hairs are

(A) pigmented

(B) medullated

(C) scale pattern in complex

(D) thin and soft

27. Which of the following elements is ***not*** typically analyzed using Neutron Activation Analysis?

(A) Gold

(B) Lead

(C) Carbon

(D) Mercury

28. How does Neutron Activation Analysis contribute to forensic investigations?

(A) By determining the DNA profile of suspects

(B) By identifying the elemental composition of evidence

(C) By analyzing blood types

(D) By reconstructing crime scenes

29. Which of the following is a common solvent used in NMR spectroscopy?

(A) Water

(B) Ethanol

(C) Deuterated chloroform ($CDCl_3$)

(D) Acetic acid

30. Which property of atomic nuclei is exploited in NMR?

(A) Mass

(B) Charge

(C) Spin

(D) Energy levels

31. Which type of information can NMR provide about a compound?

(A) Molecular weight only

(B) Elemental composition only

(C) Molecular structure and dynamics

(D) Physical appearance

32. In NMR spectroscopy, what does the term 'chemical shift' refer to?

(A) The change in temperature of the sample

(B) The change in the magnetic field strength

(C) The difference in resonance frequency due to the electronic environment around nuclei

(D) The change in the sample's concentration

33. What is the Beer-Lambert Law?

(A) A principle for measuring temperature

(B) A relationship between absorbance and concentration

(C) A method for calculating molecular weight

(D) A technique for separating compounds

34. What is the significance of a calibration curve in spectrophotometry?

(A) It determines the temperature of the sample

(B) It establishes a relationship between absorbance and concentration for quantifying unknown samples

(C) It measures the pH of the sample

(D) It identifies the physical state of the sample

35. Which type of microscopy is particularly useful for examining biological samples such as blood or tissue?

(A) Polarized light microscopy

(B) Scanning electron microscopy

(C) Transmission electron microscopy

(D) Fluorescence microscopy

36. Which type of microscope would be best suited for examining the internal structure of a cell?

(A) Light microscope

(B) Scanning electron microscope

(C) Transmission electron microscope

(D) Confocal microscope

37. In forensic microscopy, what is the significance of using a comparison microscope?

(A) It allows for the analysis of multiple samples simultaneously

(B) It enhances the color of the samples

(C) It measures the weight of the samples

(D) It determines the temperature of the samples

38. In forensic microscopy, what is the role of a dichroic mirror?

(A) To enhance the color of the sample

(B) To reflect specific wavelengths of light while allowing others to pass through

(C) To cool the sample

(D) To measure the weight of the sample

39. Which of the following is a limitation of X-ray imaging in Forensic Science?

(A) It can only visualize hard tissues

(B) It is non-invasive

(C) It provides real-time imaging

(D) It can analyze soft tissues effectively

40. In forensic investigations, X-rays can be used to detect which of the following?

(A) Gunshot residue

(B) Hidden weapons in luggage

(C) Fingerprints

(D) Blood stains

41. In HPLC, what is the role of the mobile phase?

(A) To provide a stationary phase for separation

(B) To carry the sample through the column

(C) To detect the compounds

(D) To cool the system

42. What is the typical pressure range for HPLC systems?

(A) 1–10 psi

(B) 100–500 psi

(C) 500–5000 psi

(D) 10000–20000 psi

43. What is the primary purpose of GC-MS in Forensic Science?

(A) To measure the weight of samples

(B) To separate and identify volatile compounds in a mixture

(C) To visualize internal structures

(D) To determine the temperature of samples

44. What is the typical temperature range for the GC oven during analysis?

(A) 0–50 °C

(B) 50–300 °C

(C) 300–500 °C

(D) 500–1000 °C

45. What is a common application of low voltage electrophoresis in Forensic Science?

(A) Analyzing small DNA fragments

(B) Protein separation

(C) Analyzing large DNA fragments

(D) All of the above

46. In a paternity dispute, which of the following genetic markers is/are commonly analyzed?

(A) Blood group antigens

(B) Mitochondrial DNAs

(C) Short Tandem Repeats (STRs)

(D) All of the above

47. What is the probability of paternity if the alleged father shares 50% of his genetic markers with the child?

(A) 0%

(B) 25%

(C) 50%

(D) 99·9%

48. What is the role of mitochondrial DNA in maternity testing?

(A) It is inherited from both parents

(B) It is inherited only from the mother

(C) It is used to determine paternity

(D) It is not useful in forensic analysis

49. In cases of disputed maternity, what is the primary source of genetic material for testing?

(A) Saliva

(B) Blood

(C) Hair

(D) All of the above

50. What is the role of Y-chromosome analysis in paternity testing?

(A) It determines maternal lineage

(B) It is used to identify male relatives

(C) It provides information about mitochondrial DNA

(D) It is not useful in paternity testing

51. What is the typical number of STR loci analyzed in a standard DNA profile for forensic purposes?

(A) 2–4

(B) 6–10

(C) 13–20

(D) 30–50

52. What is the main advantage of mitochondrial DNA analysis in forensic cases?

(A) It is faster than nuclear DNA analysis

(B) It can be used to trace maternal lineage

(C) It provides more detailed information than nuclear DNA

(D) It is less expensive than nuclear DNA analysis

53. What is the purpose of using STR analysis in forensic DNA profiling?

(A) To determine the age of the sample

(B) To identify individuals based on unique genetic markers

(C) To analyze blood types

(D) To assess the health of an individual

54. Which technique is commonly used to amplify DNA samples for profiling?

(A) Gel electrophoresis

(B) Polymerase Chain Reaction (PCR)

(C) Southern blotting

(D) DNA sequencing

55. Which enzyme is commonly tested in blood samples to help determine the blood type?

(A) Amylase

(B) Alkaline phosphatase

(C) Lactate dehydrogenase

(D) Glucose-6-phosphate dehydrogenase

56. What is the primary method used to determine blood groups in Forensic Science?

(A) Microscopy

(B) Serological testing

(C) Chromatography

(D) Spectrophotometry

57. What is the purpose of enzyme tests in forensic blood analysis?

(A) To determine the blood's viscosity

(B) To identify the presence of specific blood group antigens

(C) To assess the age of the blood sample

(D) To provide additional information about the individual's health

58. Which enzyme is commonly tested in saliva to aid in forensic analysis?

(A) Amylase

(B) Alkaline phosphatase

(C) Lactate dehydrogenase

(D) Creatine kinase

59. What is the significance of urine analysis in Forensic Science?

(A) To determine the blood type

(B) To identify the presence of drugs or toxins

(C) To assess the health of an individual

(D) To establish a biological relationship

60. Which of the following body fluids can be tested for the presence of the enzyme alkaline phosphatase?

(A) Blood

(B) Saliva

(C) Semen

(D) All of the above

61. What is the primary method used to determine blood group antigens in Forensic Science?

(A) Microscopy

(B) Serological testing

(C) Chromatography

(D) Spectrophotometry

62. Which of the following tests can be used to determine the presence of blood in a sample?

(A) Kastle-Meyer test

(B) Amylase test

(C) Urinalysis

(D) DNA profiling

63. Which of the following techniques is commonly used for the analysis of petroleum products?

(A) Gas Chromatography (GC)

(B) Mass Spectrometry (MS)

(C) Infrared Spectroscopy (IR)

(D) All of the above

64. Which of the following is a common method for determining the viscosity of petroleum products?

(A) Refractometry

(B) Kinematic viscometry

(C) Titration

(D) Chromatography

65. What is the purpose of using a Gas Chromatography in the analysis of petroleum products?

(A) To measure the density of the product

(B) To separate and analyze volatile compounds

(C) To determine the color of the product

(D) To assess the toxicity of the product

66. What is the significance of the LD50 value in toxicology?

(A) It indicates the effectiveness of a pesticide

(B) It measures the concentration of a pesticide in the environment

(C) It represents the lethal dose required to kill 50% of a test population

(D) It determines the persistence of a pesticide in soil

67. Which class of insecticides works by disrupting the nervous system of insects?

(A) Organophosphates

(B) Pyrethroids

(C) Neonicotinoids

(D) All of the above

68. What is the primary mechanism of action for neonicotinoids?

(A) Inhibition of acetylcholinesterase

(B) Activation of sodium channels

(C) Blockade of nicotinic acetylcholine receptors

(D) Disruption of the insect cuticle

69. What is the role of forensic toxicology in relation to psychotropic drugs?

(A) To develop new psychotropic medications

(B) To analyze and interpret drug-related deaths and poisonings

(C) To prescribe psychotropic medications

(D) To educate the public about mental health

70. Which of the following drugs is classified as a stimulant?

(A) Diazepam

(B) Fluoxetine

(C) Amphetamine

(D) Lithium

71. Which of the following is a common class of psychotropic drugs?

(A) Antibiotics

(B) Antidepressants

(C) Analgesics

(D) Antihistamines

72. Which biological sample is most commonly analyzed for the presence of poisons in forensic investigations?

(A) Hair

(B) Urine

(C) Blood

(D) Saliva

73. What is the primary method used for the extraction of poisons from solid tissues?

(A) Liquid-liquid extraction

(B) Solid-phase extraction

(C) Soxhlet extraction

(D) Gas Chromatography

74. In forensic toxicology, which organ is often examined for the accumulation of heavy metals?

(A) Heart

(B) Liver

(C) Kidney

(D) Brain

75. Which of the following is a common method for extracting poisons from urine?

(A) Liquid-liquid extraction

(B) Solid-phase extraction

(C) Both (A) and (B)

(D) None of the above

76. What is the primary challenge in the extraction of poisons from post-mortem samples?

(A) Decomposition of the sample

(B) Low concentration of poisons

(C) Presence of interfering substances

(D) All of the above

77. What is the role of Gas Chromatography-Mass Spectrometry (GC-MS) in the analysis of poisons?

(A) To separate and identify compounds

(B) To quantify the concentration of poisons

(C) To determine the molecular structure of poisons

(D) All of the above

78. Which of the following symptoms is ***not*** commonly associated with methanol poisoning?

(A) Headache

(B) Nausea

(C) Visual disturbances

(D) Increased heart rate

79. Which of the following tests is used to confirm the presence of ethyl alcohol in a sample of illicit liquor?

(A) Liebermann's test

(B) Iodoform test

(C) Tollens' test

(D) Fehling's test

80. Which of the following is the most common body fluid used for the analysis of alcohol (ethyl alcohol) in forensic investigations?

(A) Blood

(B) Urine

(C) Saliva

(D) Cerebrospinal fluid

81. In forensic analysis, which of the following methods is most commonly used to detect the presence of alcohol (ethyl or methyl alcohol) in breath?

(A) Gas Chromatography

(B) Breathalyzer test

(C) Enzyme-Linked Immunosorbent Assay (ELISA)

(D) Thin-layer Chromatography

82. Which of the following is a common symptom of methanol poisoning that forensic experts look for in a patient?

(A) Visual disturbances, including blindness

(B) Severe abdominal pain with blood in the stool

(C) Rapid heart rate and high blood pressure

(D) Increased body temperature and sweating

83. What does the term 'caliber' refer to in the context of firearms?

(A) The weight of the projectile

(B) The length of the barrel

(C) The diameter of the bore or projectile

(D) The type of firearm

84. What is the composition of modern smokeless gunpowder used in ammunition?

(A) Potassium nitrate, sulfur and charcoal

(B) Nitroglycerin, nitrocellulose, and stabilizers

(C) Lead, copper and brass

(D) Iron, zinc and sulfur

85. Which type of firearm action operates by manually cycling the action after each shot is fired?

(A) Semi-automatic

(B) Bolt-action

(C) Pump-action

(D) Break-action

86. Which metal is commonly used for the casing of modern ammunition cartridges?

(A) Aluminum

(B) Steel

(C) Brass

(D) Zinc

87. Which of the following is the primary characteristic used to identify a firearm from a cartridge or bullet?

(A) The color of the cartridge

(B) The rifling marks on the bullet

(C) The material composition of the cartridge

(D) The weight of the bullet

88. What is the term used to describe the unique marks left on a bullet by the firearm's barrel?

(A) Tool marks

(B) Striae

(C) Primer marks

(D) Pressure marks

89. In forensic ballistics, which of the following is used to compare bullets fired from different firearms?

(A) Comparison microscope

(B) X-ray imaging

(C) Gas Chromatography

(D) Infrared Spectroscopy

90. Which part of a firearm leaves marks on a cartridge that are useful for identification?

(A) The barrel

(B) The extractor

(C) The firing pin

(D) The trigger guard

91. What is the most common feature of country-made firearms?

(A) Smoothbore barrels

(B) Rifled barrels

(C) High-quality metal construction

(D) Complex design mechanisms

92. Which factor primarily affects the velocity of a projectile fired from a firearm?

(A) Barrel length

(B) Bullet shape

(C) Caliber size

(D) Temperature of the environment

93. Which method is commonly used to estimate the range of a firearm shot?

(A) Examining the cartridge case

(B) Studying the gunpowder residue patterns on the target

(C) Observing the trajectory path

(D) Measuring the length of the barrel

94. Which of the following could be a likely cause of accidental discharge in firearms?

(A) Faulty ammunition

(B) Inexperienced shooter

(C) Weak firing pin spring

(D) All of the above

95. Which of the following is commonly used as an oxidizer in explosive compositions?

(A) Charcoal

(B) Potassium nitrate

(C) Aluminum powder

(D) Sulfur

96. What is the primary purpose of a detonator in an explosive device?

(A) To increase the energy yield

(B) To provide a timed delay

(C) To initiate the explosive reaction

(D) To control the spread of the explosion

97. Which of the following is the primary component of dynamite?

(A) TNT (Trinitrotoluene)

(B) RDX (Research Department Explosive)

(C) Ammonium nitrate

(D) Nitroglycerin

98. The effective blast radius of a bomb refers to

(A) the distance from which the bomb can be heard

(B) the maximum distance where fragments are found

(C) the area where the bomb causes damage or injury

(D) the temperature around the explosion site

99. During combustion, which type of reaction typically occurs in explosives?

(A) Endothermic reaction

(B) Exothermic reaction

(C) Neutral reaction

(D) Catalytic reaction

100. Which of the following is ***not*** a typical component of an IED?

(A) Initiator

(B) Explosive charge

(C) Container

(D) Oxygen cylinder

101. Which material is commonly found in country-made bombs as an explosive filler?

(A) Gelignite

(B) Fertilizer

(C) TNT (Trinitrotoluene)

(D) C-4

102. Which of the following trigger mechanisms is most commonly used in IEDs for remote detonation?

(A) Timer switch

(B) Pressure switch

(C) Radio Frequency (RF) trigger

(D) Tripwire

103. Which of the following methods is most commonly used in Forensic Science to analyze fiber structure and composition?

(A) Chromatography

(B) Spectrophotometry

(C) Polarized Light Microscopy (PLM)

(D) Electrophoresis

104. Which technique is often used to determine the chemical composition of a fiber by analyzing the specific elements it contains?

(A) Gas Chromatography-Mass Spectrometry (GC-MS)

(B) Fourier Transform Infrared Spectroscopy (FTIR)

(C) Thin-layer Chromatography (TLC)

(D) X-ray diffraction (XRD)

105. While classifying fibers, which of the following properties is ***least*** useful for distinguishing between natural and synthetic fibers?

(A) Elasticity

(B) Cross-sectional shape

(C) Burn test odor

(D) Chemical composition

106. Which of the following statements about fiber birefringence is ***correct***?

(A) Birefringence can be used to determine the natural origin of fibers

(B) Synthetic fibers do not exhibit birefringence

(C) Birefringence can only be observed in colored fibers

(D) Birefringence helps differentiate between types of synthetic fibers

107. Which of the following fibers is most likely to show fluorescence under ultraviolet light?

(A) Wool

(B) Nylon

(C) Cotton

(D) Silk

108. A forensic scientist is examining a fiber under a microscope and notices striations along its length. This observation is most consistent with which type of fiber?

(A) Nylon

(B) Wool

(C) Silk

(D) Cotton

109. Which component in urine can be used in Forensic Science to estimate the age of a urine stain?

(A) Creatinine levels

(B) Urea concentration

(C) Potassium levels

(D) Ammonia presence

110. Forensic testing for the presence of which enzyme can help confirm a sample as milk?

(A) Amylase

(B) Lactase

(C) Lipase

(D) Alkaline phosphatase

111. The presence of which of the following in a forensic sample would strongly indicate contamination with fecal matter?

(A) *E. coli* bacteria

(B) Salivary amylase

(C) Lactase

(D) Hemoglobin

112. Which of the following methods is often used to detect urea in forensic samples suspected to contain urine?

(A) Litmus paper

(B) Bromothymol blue test

(C) Nessler's reagent

(D) Kastle-Meyer test

113. Which enzyme is commonly tested in saliva samples to confirm the presence of saliva in forensic analysis?

(A) Amylase

(B) Lipase

(C) Lactase

(D) Protease

114. Which confirmatory test for semen detection is based on the presence of spermatozoa?

(A) Acid phosphatase test

(B) P30/PSA test

(C) Hemastix test

(D) Kastle-Meyer test

115. What is the most common presumptive color test for semen, which produces a purple color in the presence of acid phosphatase?

(A) Brentamine Fast Blue test

(B) Kastle-Meyer test

(C) Phadebas test

(D) Nessler's test

116. In forensic analysis, the identification of semen stains can be complicated by the absence of sperm cells. What is this condition known as?

(A) Aspermia

(B) Oligospermia

(C) Azoospermia

(D) Hypospermia

117. In forensic analysis, which of the following substances in semen is analyzed to establish human origin?

(A) Amylase

(B) Casein

(C) Prostate-Specific Antigen (PSA)

(D) Lactase

118. In forensic analysis, which part of the hair is most important for DNA analysis and individual identification?

(A) Shaft

(B) Cuticle

(C) Medulla

(D) Root

119. Mitochondrial DNA (mtDNA) is commonly extracted from which part of the hair when no root is present?

(A) Cuticle

(B) Cortex

(C) Medulla

(D) Hair shaft

120. Which characteristic of hair is used to determine the body site of origin?

(A) Hair color

(B) Medullary index

(C) Diameter and cross-section

(D) Growth phase

121. Which of the following characteristics of hair can sometimes indicate racial origin in forensic analysis?

(A) Hair shaft length

(B) Hair color

(C) Cross-sectional shape

(D) Medullary index

122. Which body site hair is typically thicker and coarser with a higher medullary index?

(A) Scalp hair

(B) Eyebrow hair

(C) Leg hair

(D) Pubic hair

123. The medullary index is an important feature in species identification. What is the medullary index in humans compared to animals?

(A) Lower than animals

(B) Higher than animals

(C) Same as animals

(D) Absent in humans

124. Which technique is used to identify minerals in soil samples?

(A) Thin-layer Chromatography

(B) X-ray diffraction (XRD)

(C) Mass Spectrometry

(D) Gel electrophoresis

125. Which of the following properties is commonly analyzed to match soil samples in forensic investigations?

(A) Texture and color

(B) Moisture content

(C) Specific gravity

(D) Hardness

126. Which component is often analyzed in cement to confirm its origin in forensic analysis?

(A) Calcium carbonate

(B) Silica content

(C) Aluminum content

(D) All of the above

127. Which technique is commonly used to differentiate between inks on a document?

(A) Gas Chromatography-Mass Spectrometry (GC-MS)

(B) Infrared spectroscopy

(C) Thin-layer Chromatography (TLC)

(D) X-ray diffraction

128. Which type of tool mark is formed when a tool slides across a surface, leaving a distinct pattern?

(A) Striated mark

(B) Indented mark

(C) Impressed mark

(D) Gouge mark

129. Which of the following is often used to analyze the elemental composition of forensic samples such as soil, glass and paint?

(A) X-ray fluorescence (XRF)

(B) Phase-contrast microscopy

(C) Paper chromatography

(D) Spectrophotometry

130. Which of the following is a standard method used to analyze the layer structure of paint in forensic cases?

(A) UV spectroscopy

(B) Gas Chromatography

(C) Cross-section microscopy

(D) Thin-layer Chromatography

131. Which method is commonly used to collect and preserve tire mark impressions at a crime scene?

(A) Gel lifting

(B) Casting with dental stone

(C) Luminol spraying

(D) High-speed photography

132. What is a common technique used to lift shoe prints from dusty surfaces?

(A) Electrostatic lifting

(B) Dental stone casting

(C) Fingerprint powder

(D) Chemical etching

133. While examining a hit-and-run case, what is the most common trace evidence left by a vehicle that can help identify it?

(A) Soil samples

(B) Paint chips

(C) Glass fragments

(D) Tire pressure

134. Which test is commonly used to determine if a newborn was alive at the time of birth in cases of suspected infanticide?

(A) Hydrostatic lung test

(B) Blood typing

(C) Starch test

(D) Griess test

135. Yaw marks are generally produced in which of the following situations?

(A) Sudden acceleration

(B) Steering without braking at high speed

(C) Hard braking on a wet surface

(D) A stationary vehicle

136. Which physical sign is commonly associated with recent sexual assault in female victims?

(A) Lividity

(B) Hymenal tear

(C) Cyanosis

(D) Skin pallor

137. In a forensic analysis, what does the sequence of radial and concentric cracks in broken glass help determine?

(A) Thickness of the glass

(B) Direction of force

(C) Age of the glass

(D) Color of the glass

138. What does a cross-sectional analysis of paint reveal that is helpful in forensic investigations?

(A) The refractive index of the paint

(B) The sequence and number of paint layers

(C) The weight of the paint sample

(D) The exact chemical composition of the binder

139. Pyrolysis Gas Chromatography-Mass Spectrometry (Py-GC-MS) is particularly useful in analyzing which component of paint?

(A) Pigment

(B) Solvent

(C) Binder

(D) Filler

140. Which type of light is useful for examining ink that may have been altered or obliterated?

(A) Infrared light

(B) Visible light

(C) Ultraviolet light

(D) X-ray

141. Ink dating in Forensic Science often relies on detecting the presence of which component that changes over time?

(A) Pigments

(B) Binders

(C) Volatile Organic Compounds (VOCs)

(D) Filler materials

142. In forensic analysis, which feature of a tire mark can help link it to a specific vehicle?

(A) Tread pattern

(B) Tire pressure

(C) Skid length

(D) Road surface texture

143. What is the primary use of polarized light microscopy in forensic cement analysis?

(A) To measure particle density

(B) To identify mineral composition

(C) To analyze organic content

(D) To determine color variations

144. Which fingerprint pattern is most common in the population?

(A) Loop

(B) Whorl

(C) Arch

(D) Composite

145. Which feature is considered one of the most unique for individual identification in Forensic Science?

(A) Ear shape

(B) Eye color

(C) Fingerprint pattern

(D) Hair color

146. Which skeletal feature is commonly used to estimate the sex of an individual in forensic anthropology?

(A) Skull shape

(B) Length of the femur

(C) Shape of the pelvic bone

(D) Number of teeth

147. Which part of the tooth is used to analyze DNA in forensic cases?

(A) Enamel

(B) Crown

(C) Pulp

(D) Root

148. Which term describes the unique patterns found on the ridges of human skin used for fingerprint analysis?

(A) Ridge detail

(B) Minutiae

(C) Dermatoglyphics

(D) Core patterns

149. Which feature of the human iris is used in iris recognition technology for personal identification?

(A) Color of the iris

(B) Size of the iris

(C) Unique patterns within the iris

(D) Blood vessel pattern on the iris

150. What is the primary characteristic of footprints that allows forensic scientists to identify individuals?

(A) The shape of the foot

(B) Unique wear patterns and ridge detail

(C) Size of the toes

(D) Color of the print

151. Which type of footprint impression is commonly left at a crime scene when a person steps on a hard surface with a dusty or dirty shoe?

(A) Latent impression

(B) Patent impression

(C) Molded impression

(D) Trace impression

152. What is the primary purpose of using an electrostatic dust lifting device in footprint analysis?

(A) To identify the pattern of the sole

(B) To capture invisible dust prints on surfaces

(C) To make an exact 3D model of the footprint

(D) To analyze the weight distribution of the print

153. Which term describes the analysis of a person's walking pattern, which can help in identifying suspects?

(A) Posture analysis

(B) Motion capture

(C) Gait analysis

(D) Step measurement

154. In forensic facial reconstruction, which feature is most often used to reconstruct the face from the skull?

(A) Eye color

(B) Skin texture

(C) Muscle attachment sites

(D) Thickness of the skull

155. Which skeletal feature is used to determine the age of a deceased person?

(A) Length of the femur

(B) Cranial sutures

(C) Shape of the pelvis

(D) Size of the mandible

156. Which bone feature is most helpful in estimating the ancestry of a deceased individual?

(A) Pelvic shape

(B) Femoral length

(C) Skull morphology

(D) Rib curvature

157. What is the forensic term for the study of human skeletal remains to determine identity and cause of death?

(A) Osteology

(B) Anthropology

(C) Forensic odontology

(D) Forensic anthropology

158. In cases where only part of the skeleton is found, which bone is most commonly used for DNA analysis?

(A) Skull

(B) Femur

(C) Ribs

(D) Pelvis

159. Which type of DNA is often used in forensic anthropology for lineage tracing when nuclear DNA is degraded?

(A) Autosomal DNA

(B) Mitochondrial DNA

(C) Ribosomal DNA

(D) Chromosomal DNA

160. Which forensic technique allows scientists to amplify small samples of DNA to create a profile for identification?

(A) Restriction Fragment Length Polymorphism (RFLP)

(B) Polymerase Chain Reaction (PCR)

(C) Gel electrophoresis

(D) Mass Spectrometry

161. Which method is often used to make latent footprint impressions visible on a non-porous surface?

(A) Electrostatic dust lifter

(B) Luminol

(C) UV light

(D) Powder dusting

162. Which of the following can indicate a limp or injury in a person's footprint pattern?

(A) A consistently even print

(B) Deeper impressions on one side

(C) Shortened toe area

(D) Scattered print patterns

163. Which of the following methods is a non-destructive technique for ink identification?

(A) Solubility test

(B) Thin-layer Chromatography

(C) UV-Vis spectrophotometer

(D) Video spectral analysis

164. Ossification centres of bones may be used for determination of

(A) sex

(B) age

(C) stature

(D) time since death

165. In questioned document analysis, what does the term 'indented writing' refer to?

(A) Writings that are heavily pressed onto paper

(B) Writings that are produced by typewriters

(C) Indentations left on a paper from previous sheets

(D) Overlapping signatures on a document

166. While examining handwriting, which of the following features is ***not*** typically considered during the preliminary examination?

(A) Size of letters

(B) Line quality and pressure

(C) Pen lifts and stops

(D) Detailed letter formation and slant

167. What is the main purpose of examining watermark in questioned documents?

(A) To determine the document's age

(B) To identify the paper manufacturer

(C) To reveal hidden messages

(D) To analyze ink distribution

168. Which instrument is commonly used to detect alterations in questioned documents during a preliminary examination?

(A) Spectrophotometer

(B) Electrostatic Detection Apparatus (ESDA)

(C) Microscope

(D) Thin-layer Chromatography (TLC)

169. In forensic document examination, obliterations refer to

(A) additions to the document

(B) overwriting or covering original content

(C) identifying indentations in writing

(D) determining the age of paper

170. Which tool is helpful in detecting differences in ink such as those used for signatures or corrections on documents?

(A) Ultraviolet (UV) light

(B) Ruler

(C) Scanning Electron Microscope (SEM)

(D) Photocopier

171. Which type of printing technology is commonly considered an electrical reproduction method?

(A) Offset Printing

(B) Inkjet Printing

(C) Laser Printing

(D) Carbon Copying

172. In forensic document examination, which tool is commonly used to analyze toner-based printing?

(A) Microscope

(B) Electrostatic Detection Apparatus (ESDA)

(C) Thin-layer Chromatography (TLC)

(D) Spectrophotometer

173. Choose the ***correct*** sequence of processing of crime scene investigation from the codes given below the sequences :

(i) Search of crime scene.

(ii) Protection of crime scene.

(iii) Photography of crime scene.

(iv) Sketching of crime scene.

(v) Collection of physical evidence.

Codes :

(A) *(i), (ii), (iii), (iv), (v)*

(B) *(ii), (iii), (iv), (i), (v)*

(C) *(iii), (ii), (iv), (v), (i)*

(D) *(iv), (v), (ii), (iii), (i)*

174. Which device is used to detect indentations on a page that might suggest document reproduction through a typewriter?

(A) Electrostatic Detection Apparatus (ESDA)

(B) Ultraviolet Light

(C) Infrared Light

(D) Digital Scanner

175. A court case is trying to determine the father of a particular baby. The mother has Type O blood and the baby has Type B blood. Which of the following blood types would mean that the man was definitely not the father of the baby?

(A) B and A

(B) AB and A

(C) O and B

(D) O and A

176. Which characteristic is typically analyzed to determine if a document was produced by an inkjet printer?

(A) Presence of toner particles

(B) Paper indentations

(C) Microscopic ink dots

(D) Mechanical impression marks

177. How does forensic document examination differentiate between photocopies and originals?

(A) By checking for paper quality differences

(B) By identifying toner or ink distribution patterns

(C) By measuring indentations

(D) By comparing writing styles

178. Which method is commonly used to analyze ink composition in documents reproduced through mechanical means?

(A) Gas Chromatography

(B) Mass Spectrometry

(C) Thin-layer Chromatography (TLC)

(D) Electrostatic Detection

179. In the context of Forensic Science, how is 'carbon copying' generally classified?

(A) Digital reproduction

(B) Photographic reproduction

(C) Mechanical reproduction

(D) Electrical reproduction

180. Teichmann test is confirmatory test for the presence of

(A) blood

(B) semen

(C) saliva

(D) urine

181. Which forensic feature is most important while determining the age of a wound?

(A) The color and texture of the wound

(B) The depth and type of the wound

(C) The location and size of the wound

(D) The presence of microbial infections

182. Which type of wound is characterized by a 'rim of abrasion' around the edge of the injury?

(A) Incised wound

(B) Gunshot wound

(C) Laceration

(D) Puncture wound

183. Which of the following best describes a 'laceration'?

(A) A shallow scrape or abrasion

(B) A deep cut with smooth edges

(C) A jagged, irregular wound caused by blunt force

(D) A puncture wound caused by a sharp object

184. Which of the following is the first visible post-mortem change in a body?

(A) Rigor mortis

(B) Livor mortis

(C) Putrefaction

(D) Pallor mortis

185. When does livor mortis typically become visible after death?

(A) Immediately after death

(B) 12–24 hours after death

(C) 2–6 hours after death

(D) 48–72 hours after death

186. Which of the following changes is associated with the natural decomposition process after death?

(A) Rigor mortis

(B) Putrefaction

(C) Hypostasis

(D) Autolysis

187. What is 'algor mortis'?

(A) The cessation of breathing after death

(B) The cooling of the body after death

(C) The stiffening of muscles after death

(D) The discoloration of the skin after death

188. What is the primary mechanism responsible for asphyxial death in hanging?

(A) Airway obstruction

(B) Cerebral hypoxia

(C) Cardiac arrest

(D) Trauma to the neck

189. Which of the following post-mortem findings is typical in cases of asphyxial death due to hanging?

(A) Bruising on the neck

(B) Fractures of the hyoid bone

(C) Elevated levels of carbon monoxide in the blood

(D) Edema in the lungs

190. Which of the following is a key factor in determining the cause of death in cases of asphyxiation?

(A) The color of the skin

(B) The presence of froth in the airways

(C) The absence of injuries

(D) All of the above

191. Which of the following tools or tests is used to detect the presence of semen during forensic examination?

(A) Acid phosphatase test

(B) Sperm cell count

(C) Rape kit examination

(D) Blood alcohol test

192. What is the legal significance of a 'rape kit' in Forensic Science?

(A) It is used to collect samples for DNA profiling only

(B) It is used to store the victim's clothing and belongings

(C) It is used to collect and preserve physical evidence from the victim after a sexual assault

(D) It is used to determine the mental state of the victim

193. Which of the following post-mortem findings would support a diagnosis of infanticide by suffocation?

(A) Multiple fractures of ribs

(B) Marked cyanosis and swelling of the face

(C) Dilated pupils

(D) Lacerations on the genitalia

194. Which of the following conditions could indicate that an infant was alive at the time of birth?

(A) Absence of gas in the stomach

(B) Cyanosis and facial bruising

(C) Presence of air bubbles in the lung tissue

(D) Lack of circulation in the umbilical cord

195. Which of the following is a commonly used psychiatric test to determine the mental state of a defendant in criminal cases?

(A) Rorschach Inkblot test

(B) Mini-Mental State Examination (MMSE)

(C) The Hare Psychopathy Checklist

(D) The Massachusetts Screening test

196. Which of the following mental disorders is often evaluated in forensic psychiatry to determine criminal responsibility?

(A) Schizophrenia

(B) Bipolar disorder

(C) Personality disorders (such as antisocial personality disorder)

(D) All of the above

197. Which of the following is a psychological indicator of deception that forensic experts may look for during an interview?

(A) Maintaining eye contact throughout the interview

(B) Unusual nervousness or fidgeting

(C) Speaking in a monotone voice

(D) Consistent and detailed responses

198. Which of the following is ***true*** about the use of the polygraph in criminal investigations?

(A) It is legally required to use a polygraph during all criminal investigations

(B) It is considered an infallible test for determining truth

(C) Its results are often used in criminal investigations, but they are not admissible as evidence in court

(D) It is used exclusively to test the veracity of witnesses

199. What is the primary method used by forensic experts to confirm infanticide in cases where the cause of death is uncertain?

(A) X-ray imaging

(B) Histological examination of tissues

(C) Serological testing

(D) Blood alcohol testing

200. Which of the following is ***not*** a common sign of asphyxial death?

(A) Petechial hemorrhages

(B) Cyanosis

(C) Fracture of hyoid bone

(D) Pallor

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